United Nations ECE/TRANS/WP.29/2018/58

Economic and Social Council

Distr.: General
4 April 2018

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

175th session
Geneva, 19-22 June 2018
Item 4.8.6 of the provisional agenda
1958 Agreement:
Consideration of draft amendments
to existing UN Regulations submitted by GRRF

Proposal for Supplement 4 to UN Regulation No. 108 (Retreaded tyres for passenger cars and their trailers)

Submitted by the Working Party on Brakes and Running Gear*

The text reproduced below was adopted by the Working Party on Brakes and Running Gear (GRRF) at its eighty-sixth session (ECE/TRANS/WP.29/GRRF/86, para. 34). It is based on ECE/TRANS/WP.29/GRRF/2018/8 and Annex IV to the report. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration at their June 2018 sessions.

* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21/Add.1, cluster 3.1), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

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Please recycle

Supplement 4 to UN Regulation No. 108 (Retreaded tyres for passenger cars and their trailers)

Contents,

Insert a new Annex 9, to read:

"9 Procedures for snow performance testing relative to snow tyre for use in severe snow conditions

Appendix 1 Pictogram definition of Alpine symbol

Appendix 2 Test reports and test data for C1 tyres"

Paragraph 2.3.2., amend to read:

"2.3.2. "*Snow tyre*" means a tyre whose tread pattern, tread compound or structure, are primarily designed to achieve in snow conditions a performance better than that of a normal tyre with regard to its ability to initiate or maintain vehicle motion."

Insert a new paragraph 2.3.2.1., to read:

"2.3.2.1. "*Snow tyre for use in severe snow conditions*" means a snow tyre whose tread pattern, tread compound or structure is specifically designed to be used in severe snow conditions and that fulfils the requirements of paragraph 7.2. of this Regulation"

Paragraph 2.26., footnote 3, amend to read:

" [3] ETRTO, 78, Rue Defacqz, B-1060 Brussels, Belgium"

Insert new paragraphs 2.48. to 2.53., to read:

"2.48. "*Representative tyre size*" means the tyre size which is submitted to the test described in Annex 9 to this Regulation to assess the performance of a range of tyres produced by the retreading production facility with regard to their performance for use in severe snow conditions. It can be either a retreaded tyre produced with a pre-cured tread or a retreaded tyre with mould cure process.

2.49. "*Standard reference test tyre (SRTT)*" means a tyre that is produced, controlled and stored in accordance with the American Society for Testing and Materials (ASTM) standards: E1136-93 (2003) for the size 195/75R14;

2.50. "*Control tyre*" means a new production tyre that is used to establish the snow grip performance of tyre sizes unable to be fitted to the same vehicle as the standard reference test tyre – see paragraph 3.4.3. of Annex 9 to this Regulation

2.51. "*Snow grip index (SG)*" means the ratio between the performance of the candidate tyre and the performance of the standard reference test tyre.

2.52. "*Candidate tyre*" means a tyre, that is submitted to one of the procedures for snow performance testing relative to snow tyre for use in severe snow conditions – see Annex 9 to this Regulation.

2.53. Class C1 tyres: Tyres conforming to UN Regulation No. 30."

Insert a new paragraph 3.2.6.1., to read:

"3.2.6.1. The "Alpine" symbol (3-peak-mountain with snowflake) shall be added if the snow tyre is classified as "snow tyre for use in severe snow conditions". In

addition, in case a pre-cured tread is used for the retreading process, the inscription M+S or MS or M.S. or M & S and the "Alpine" symbol shall be marked, at least once, on both sides of the tread shoulder. In both cases, the "Alpine" symbol ("3-peak-mountain with snowflake") shall conform to the symbol described in Annex 9, Appendix 1."

Insert a new paragraph 4.1.4.3.1., to read:

"4.1.4.3.1. For snow tyres the list of tyres having to fulfil the requirements of paragraph 7.2."

Add new subparagraphs 4.1.4.3.1.1 and 4.1.4.3.1.2.

"4.1.4.3.1.1. For tyres retreaded by using pre-cured tread material with a tread pattern covered by paragraph 6.6.3.1. the list shall clearly identify the tyres in order to make the relevant link with the list(s) quoted in paragraph 6.6.3.1. b). The following table is as example:

Tyre Size Designation, Load indexes, Speed symbol	*TM1*	*TM2*	*TM3*
185/60 R 14 82 H	TPM1/TPR1, TR1/TL1	-	TPM2/TPR2, TR2/L2
195/65 R 15 91 H	TPM1/TPR1, TR1/TL1	-	-
205/55 R 16 94 V XL	-	TPM3/TPR3, TR3/TL3	TPM4/TPR4, TR4/TL4
235/60 R 17 102 H	-	-	-
255/45 R 18 99 V	-	TPM5/TPR5, TR5/TL5	-

Note:
TM: Identification of the Tread Manufacturer
TPM: Identification of the Tread Pattern by the tread Manufacturer
TPR: Identification of the Tread Pattern by the Retreader
TR: Number of the test report
TL: Reference of the list linked to the test report

4.1.4.3.1.2. For tyres retreaded by using either mould cure or pre-cured tread material with the same major features including tread pattern(s) as a new tyre type and covered by paragraph 6.6.3.2. the list shall clearly identify the tyres in order to make the relevant link with the list(s) quoted in paragraph 6.6.3.2. a)."

Insert new paragraphs 4.2., 4.2.1. and 4.3., to read:

"4.2. The application for approval shall be accompanied by:

4.2.1. Details of the major features, including the tread pattern, with respect to the effects on the snow grip performance of the range of tyre sizes listed as required by paragraph 4.1.4.3.1. This may be by means of descriptions supplemented by drawings and/or photographs which must be sufficient to allow the type approval authority or technical service to determine whether any subsequent changes to the major features will adversely affect the tyre performance. The effects of changes to minor details of tyre construction on tyre performances will be evident and determined during checks on conformity of production;

4.3. At the request of the Type Approval Authority, the applicant shall submit samples of tyres for test or copies of test reports from the technical services, communicated as given in paragraph 12. of this Regulation."

Paragraph 5.4., amend to read:

"5.4. Before granting approval the authority must be satisfied that retreaded tyres conform to this Regulation and that the tests have been successfully carried out:

(a) On at least five and not necessarily more than 20 samples of retreaded tyres representative of the range of tyres produced by the retreading production unit when prescribed according to paragraphs 6.7. and 6.8. and;

(b) On at least one sample of retreaded tyres, of each pattern not covered by paragraphs 6.6.3.1. and 6.6.3.2., representative of the range of tyres produced by the retreading production unit when prescribed according to paragraph 6.8.2.*. In case of paragraph 6.6.3.2., the Type Approval Authority might request a test of compliance for the retreaded tyre. Testing of sampled sizes may be confined to a worst case selection*, at the discretion of the Type Approval Authority or designated Technical Service."

Insert new paragraphs 6.6.3.1. and 6.6.3.2. and a footnote *, to read:

"6.6.3.1. For tyres retreaded by using pre-cured tread material(s) with a tread pattern not covered by paragraph 6.6.3.2. having to fulfil the requirements of paragraph 7.2. * the retreader shall ensure that the material manufacturer(s) or the material supplier(s) of the pre-cured tread material provides:

(a) To the Type Approval Authority and the Technical Service issuing the approval according to this regulation and optionally to the retreader:

(i) A copy of the test report(s) as in Annex 9, Appendix 2 of the representative tyre size(s) (see definitions in paragraph 2.) demonstrating compliance of the precured tread(s) to the requirements of paragraph 7.2.;

(b) To the retreader:

(i) The list(s) of tyre sizes to which it can be applied for the retreading process and validated by the same designated Technical Service and Type Approval Authority which issued the test report in paragraph 6.6.3.1.(a) The list(s) shall include at least the tyres defined in paragraph 4.1.4.3.1.1.

(ii) A copy of the measures taken to ensure the conformity of production.

These measures shall include test results demonstrating that the minimum levels of the snow performances required in paragraph 7.2.1. will be maintained and demonstration periodically the compliance with the requirement defined in paragraph 9.2.3 or 9.4.3.

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* If a tread pattern can be applied by mould cure and pre-cured retread processes,the snow test may be performed with a representative tyre size retreaded with only one of the two possible processes and the snow performance test report can be used for both cases as long as the major features of the tread are technically identical. This will be proven by means of written official permission by the holder of the tread snow performance report.

6.6.3.2. For tyres retreaded by using either mould cure or pre-cured tread material(s) with the same major features including tread pattern(s) as a new tyre type approved according to UN Regulation No. 117 having fulfilled the

requirements about minimum snow performance in severe snow conditions, the retreader shall ensure that the manufacturer of the new tyre type provides:

(a) To the Type Approval Authority and Technical Service issuing the approval according to this regulation and optionally to the retreader a copy of the UN Regulation No. 117 certificate(s) and a copy of the appropriate test report(s) issued by a designated Technical Service** demonstrating compliance of the new tyre to the minimum snow performance in severe snow conditions.

(b) To the retreader:

(i) The list(s) of tyre sizes to which it can be applied for the retreading process and validated by the same designated Technical Service** and/or Type Approval Authority that issued the UN Regulation No. 117 certificate(s). The list(s) shall include at least the tyres defined in paragraph 4.1.4.3.1.2.

(ii) The drawing(s) of the tread pattern(s) covered by the UN Regulation No. 117 certificate(s);

(iii) A copy of the last report of the conformity of production as required in UN Regulation No. 117 and demonstration periodically the compliance with the requirement defined in paragraph 9.2.4. or paragraph 9.4.4."

** Refer to the designated Technical Services listed in the document ECE/TRANS/WP.29/343 in its latest revision.

Paragraph 6.8., amend to read:

"6.8. Performance tests"

Insert a new paragraph 6.8.1., to read:

"6.8.1. Load/speed endurance test:"

Renumber former paragraph 6.8.1. *as* 6.8.1.1.

Renumber paragraphs 6.8.2. and 6.8.3. as 6.8.1.2. and 6.8.1.3.

Insert new paragraphs 6.8.2. and 6.8.2.1., to read:

"6.8.2. Snow test

6.8.2.1. Retreated Snow Tyres for use in severe snow conditions to comply with this regulation shall be capable of meeting snow performance test as specified in Annex 9 to this Regulation."

Insert new paragraphs 7.2. and 7.2.1., to read:

"7.2. In order to be classified as a "snow tyre for use in severe snow conditions", the retreaded tyre to comply with this Regulation shall meet the performance requirements of paragraph 7.2.1. The retreaded tyre size shall meet these requirements based on a test method of Annex 9 by which:

(a) The mean fully developed deceleration ("mfdd") in a braking test;

(b) Or alternatively an average traction force in a traction test;"

7.2.1. For Class C1 tyres, the minimum snow index value, as calculated in the procedure described in Annex 10 and compared with the SRTT shall be as follows:

Class of tyre	*Snow grip index (brake on snow method) (a)*	*Snow grip index (spin traction method) (b)*
C1	*1.07*	*1.10*

Notes:
(a) See paragraph 3. of Annex 9 to this Regulation
(b) See paragraph 2. of Annex 9 to this Regulation"

Paragraph 9.2., amend to read:

"9.2. The holder of the approval shall ensure that, at least the following number of tyres, representative of the range being produced, is checked and tested as prescribed in this Regulation:"

Paragraph 9.2.1., amend to read:

"9.2.1. 0.01 per cent of the total annual production but in any case not less than five and not necessarily more than 20 during each year of production, and spread throughout that year;"

Insert a new paragraph 9.2.2., to read:

"9.2.2. At least 1 tyre once every two years in order to verify conformity of the performance of the snow tyres for use in severe snow conditions fulfilling paragraph 6.8.2. and not covered by paragraphs 6.6.3.1. or 6.6.3.2."

Insert a new paragraph 9.2.3., to read:

"9.2.3. At least 1 tyre once every four years in order to verify conformity of the performance of the snow tyres for use in severe snow conditions fulfilling paragraph 6.8.2. and covered by paragraphs 6.6.3.1. The retreader can use the snow performance periodic test results obtained by the tread manufacturer or tread supplier for this purpose."

Insert a new paragraph 9.2.4., to read:

"9.2.4. At least 1 tyre once every four years in order to verify conformity of the performance of the snow tyres for use in severe snow conditions fulfilling paragraph 6.8.2. and covered by paragraphs 6.6.3.2. The retreader can use the snow performance periodic test results obtained by the owner of the original UN Regulation No. 117 approval certificate."

Paragraph 9.4., amend to read:

"9.4. The authority which has approved the retreading production unit may at any time verify the conformity control methods applied in each production facility including among others the prescriptions defined in the paragraph 6.6.3.1.(c) and 6.6.3.2.(c). For each production facility, the type Approval Authority shall take samples at random and at least the following number of tyres, representative of the range being produced, shall be checked and tested as prescribed in this Regulation:"

Paragraph 9.4.1., amend to read:

"9.4.1. 0.01 per cent of the total annual production but in any case not less than five and not necessarily more than 20 during each and every production year;"

Insert a new paragraph *9.4.2.*, to read:

"9.4.2. At least 1 tyre once every two years in order to verify conformity of the performance of the snow tyres for use in severe snow conditions fulfilling paragraph 6.8.2. and not covered by paragraphs 6.6.3.1. or 6.6.3.2."

Insert a new paragraph 9.4.3., to read:

"9.4.3. At least 1 tyre once every four years in order to verify conformity of the performance of the snow tyres for use in severe snow conditions fulfilling paragraph 6.8.2. and covered by paragraphs 6.6.3.1. The retreader can use the snow performance periodic test results obtained by the tread manufacturer or tread supplier for this purpose."

Insert a new paragraph 9.4.4., to read:

"9.4.4. At least 1 tyre once every four years in order to verify conformity of the performance of the snow tyres for use in severe snow conditions fulfilling paragraph 6.8.2. and covered by paragraphs 6.6.3.2. The retreader can use the snow performance periodic test results obtained by the owner of the original UN Regulation No. 117 approval certificate."

Insert a new Annex 9, to read:

"Annex 9

Procedures for snow performance testing relative to snow tyre for use in severe snow conditions

1. Specific definitions for snow test when different from existing ones

1.1. "*Test run*" means a single pass of a loaded tyre over a given test surface.

1.2. "*Braking test*" means a series of a specified number of ABS-braking test runs of the same tyre repeated within a short time frame.

1.3. "Acceleration test" means a series of specified number of traction controlled acceleration test runs of the same tyre repeated within a short timeframe

2. Spin traction method for Class C1 tyres

The test procedure of ASTM standard F1805-06 shall be used to assess snow performance through spin traction values on medium packed snow (The snow compaction index measured with a CTI penetrometer[1] shall be between 70 and 80).

2.1. The test course surface shall be composed of a medium packed snow surface, as characterized in table A2.1 of ASTM standard F1805-06.

2.2. The tyre load for testing shall be as per option 2 in paragraph 11.9.2. of ASTM standard F1805-06

3. Braking on snow method for Class C1 tyres

3.1. General conditions

3.1.1. Test course

The braking tests shall be done on a flat test surface of sufficient length and width, with a maximum 2 per cent gradient, covered with packed snow. The snow surface shall be composed of a hard packed snow base at least 3 cm thick and a surface layer of medium packed and prepared snow about 2 cm thick. The air temperature, measured about one meter above the ground, shall be between -2 °C and -15 °C; the snow temperature, measured at a depth of about one centimeter, shall be between -4 °C and -15 °C. It is recommended to avoid direct sunlight, large variations of sunlight or humidity, as well as

wind. The snow compaction index measured with a CTI penetrometer[1] shall be between 75 and 85.

[1] See appendix of ASTM standard F1805-06 for details.

3.1.2. Vehicle

The test shall be conducted with a standard production vehicle in good running order and equipped with an ABS system. The vehicle used shall be such that the loads on each wheel are appropriate to the tyres being tested. Several different tyre sizes can be tested on the same vehicle.

3.1.3. Tyres

The tyres should be "broken-in" prior to testing to remove spew, compound nodules or flashes resulting from the moulding process. The tyre surface in contact with snow shall be cleaned before performing a test. Tyres shall be conditioned at the outdoor ambient temperature at least two hours before their mounting for tests. Tyre pressures shall then be adjusted to the values specified for the test. In case a vehicle cannot accommodate both the reference and candidate tyres, a third tyre ("control" tyre) may be used as an intermediate. First test control vs. reference on another vehicle, then test candidate vs. control on the vehicle

3.1.4. Load and pressure

3.1.4.1. For C1 tyres, the vehicle load shall be such that the resulting loads on the tyres are between 60 per cent and 90 per cent of the load corresponding to the tyre load index. The cold inflation pressure shall be 240 kPa.

3.1.5. Instrumentation

The vehicle shall be fitted with calibrated sensors suitable for measurements in winter. There shall be a data acquisition system to store measurements. The accuracy of measurement sensors and systems shall be such that the relative uncertainty of the measured or computed mean fully developed decelerations is less than 1 per cent.

3.2. Testing sequences

3.2.1. For every candidate tyre and the standard reference tyre, ABS-braking test runs shall be repeated a minimum of 6 times. The zones where ABS-braking is fully applied shall not overlap. When a new set of tyres is tested, the runs are performed after shifting aside the vehicle trajectory in order not to brake on the tracks of the previous tyre. When it is no longer possible not to overlap full ABS-braking zones, the test course shall be re-groomed.

Required sequence:

6 repeats SRTT, then shift aside to test next tyre on fresh surface

6 repeats Candidate 1, then shift aside

6 repeats Candidate 2, then shift aside

6 repeats SRTT, then shift aside

3.2.2. Order of testing:

If only one candidate tyre is to be evaluated, the order of testing shall be:

R1 - T - R2

Where:

R1 is the initial test of the SRTT, R2 is the repeat test of the SRTT and

T is the test of the candidate tyre to be evaluated.

A maximum of two candidate tyres may be tested before repeating

the SRTT test, for example:

R1 - T1 - T2 - R2.

3.2.3. The comparative tests of SRTT and candidate tyres shall be repeated on two different days.

3.3. Test procedure

3.3.1. Drive the vehicle at a speed not lower than 28 km/h.

3.3.2. When the measuring zone has been reached, the vehicle gear is set into neutral, the brake pedal is depressed sharply by a constant force sufficient to cause operation of the ABS on all wheels of the vehicle and to result in stable deceleration of the vehicle and held down until the speed is lower than 8 km/h.

3.3.3. The mean fully developed deceleration between 25 km/h and 10 km/h shall be computed from time, distance, speed, or acceleration measurements.

3.4. Data evaluation and presentation of results

3.4.1. Parameters to be reported

3.4.1.1. For each tyre and each braking test, the mean and standard deviation of the mfdd shall be computed and reported. The coefficient of variation CV of a tyre braking test shall be computed as:

$$CV(\text{tyre}) = \frac{\text{Std. dev (tyre)}}{\text{Mean (tyre)}}$$

3.4.1.2 Weighted averages (wa) of two successive tests of the SRTT shall be computed taking into account the number of candidate tyres in between:

In the case of the order of testing R1 - T - R2, the weighted average of the SRTT to be used in the comparison of the performance of the candidate tyre shall be taken to be:

wa(SRTT) = (R1 + R2)/2

Where:

R1 is the mean fully developed deceleration for the first test of the SRTT and R2 is the mean mfdd for the second test of the SRTT.

In the case of the order of testing R1 – T1 – T2 – R2, the weighted average (wa) of the SRTT to be used in the comparison of the performance of the candidate tyre shall be taken to be:

wa (SRTT) = 2/3 R1 + 1/3 R2 for comparison with the candidate

tyre T1; and:

wa (SRTT) = 1/3 R1 + 2/3 R2 for comparison with the candidate tyre T2.

3.4.1.3. The snow grip index (SG) in per cent of a candidate tyre shall be computed as:

Mean (candidate)

SnowGrip Index (candidate) = ----------

wa (SRTT)

3.4.2. Statistical validations

The sets of repeats of measured or computed mfdd for each tyre should be examined for normality, drift, eventual outliers. The consistency of the means and standard-deviations of successive braking tests of SRTT should be examined. The means of two successive SRTT braking tests shall not differ by more than 5 per cent. The coefficient of variation of any braking test shall be less than 6 per cent. If those conditions are not met, tests shall be performed again after regrooming the test course.

3.4.3. In the case where the candidate tyres cannot be fitted to the same vehicle as the SRTT, for example, due to tyre size, inability to achieve required loading and so on, comparison shall be made using intermediate tyres, hereinafter referred to as "control tyres", and two different vehicles. One vehicle shall be capable of being fitted with the SRTT and the control tyre and the other vehicle shall be capable of being fitted with the control tyre and the candidate tyre.

3.4.3.1. The snow grip index of the control tyre relative to the SRTT (SG1) and of the candidate tyre relative to the control tyre (SG2) shall be established using the procedure in paragraphs 3.1. to 3.4.2. above. The snow grip index of the candidate tyre relative to the SRTT shall be the product of the two resulting snow grip indices that is SG1 x SG2.

3.4.3.2. The ambient conditions shall be comparable. All tests shall be completed within the same day.

3.4.3.3. The same set of control tyres shall be used for comparison with the SRTT and with the candidate tyre and shall be fitted in the same wheel positions.

3.4.3.4. Control tyres that have been used for testing shall subsequently be stored under the same conditions as required for the SRTT.

3.4.3.5. The SRTT and control tyres shall be discarded if there is irregular wear or damage or when the performance appears to have been deteriorated.

Annex 9 - Appendix 1

Pictogram definition of "Alpine Symbol"

Minimum 15 mm base and 15 mm height.
(Please note that the drawing above is not to scale.)

Annex 9 - Appendix 2

Test reports and test data for C1 tyres

Part 1 – Report

1. Type Approval Authority or Technical Service:.....
2. Name and address of applicant: .....
3. Test report No.: .....
4. Manufacturer and brand name or trade description:
5. Tyre class: .....
6. Category of use: .....
7. Snow index relative to SRTT according to paragraph 7.2.1.

7.1. Test procedure and SRTT used.....

8. Comments (if any):.....
9. Date: .....
10. Signature: .....
11. Signature of the technical service:
12. Signature of the Type Approval Authority:

Part 2 - Test data

1. Date of test: .....

2. Location of test track: .....

2.1. Test track characteristics:

	At start of tests	*At end of tests*	*Specification*
Weather			
Ambient temperature			-2 °C to -15 °C
Snow temperature			-4 °C to -15 °C
CTI index			75 to 85
Other			

3. Test vehicle (make, model and type, year): .....

4. Test tyre details .....

4.1. Tyre size designation and service description: .....

4.2. Tyre brand and trade description: .....

4.3. Test tyre data:

	SRTT (1st test)	*Candidate*	*Candidate*	*SRTT (2nd test)*
Tyre dimensions				
Test rim width code				
Tyre loads F/R (kg)				
Load index F/R (per cent)				
Tyre pressure F/R(kPa)				

5. Test results: mean fully developed decelerations (m/s^2) coefficient.

Run number	*Specification*	*SRTT (1st test)*	*Candidate*	*Candidate*	*SRTT (2nd test)*
1					
2					
3					
4					
5					
6					
Mean					
Std-deviation					
CV (%)	< 6 %				
Validation SRTT	(SRTT) < 5%	X	X	X	
SRTT average			X	X	X
Snow index		1.00			X

"